



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,658	07/31/2003	Thomas A. Taylor	CS-21320	9490

7590 11/01/2004

PRAXAIR, INC.
LAW DEPT - M1557
39 OLD RIDGEBURY ROAD
DANBURY, CT 06810-5113

EXAMINER

BAREFORD, KATHERINE A

ART UNIT PAPER NUMBER

1762

DATE MAILED: 11/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/630,658

Applicant(s)

TAYLOR, THOMAS A.

Examiner

Katherine A. Bareford

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 14-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-13, drawn to a method, classified in class 427, subclass 454.

II. Claims 14-20, drawn to a product, classified in class 428, subclass 68⁸~~9~~.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process, such as thermal spraying without a gas shield, while holding the spray device closer to the substrate.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Mr. Coon on October 14, 2004 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-13. Affirmation of this election must be made by applicant in replying to this Office action. Claims 14-20 are

withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Objections

5. Claim 9 is objected to because of the following informalities: in claim 9, line 3, the second comma should be removed after "argon" for grammatical clarity. Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-6 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zurecki et al (US 5738281) in view of Nowotarski et al (US 5486383).

Zurecki teaches a method of placing a gas shroud around a turbulent gas jet. Column 1, lines 5-15. This method can be used in spraying applications, such as thermal spray coating. Column 4, lines 15-25. A jet exits from an orifice of the thermal spray device and is surrounded with a coaxial gas shield having a shield gas flow substantially surrounding the effluent of the thermal spray device. Column 3, lines 1-25. By using an inert surrounding gas, when thermal

spraying, the amount of oxygen aspirated into the jet is reduced, thus minimizing the oxidation of the sprayed coating material and providing a desired microstructure of a coating with minimized oxidation of the coating material as supplied. Column 4, lines 15-25. As shown by Example 3, oxygen concentration in the spray jets of shrouded spray devices of Zurecki can be well over 50% less than for unshrouded jets at the same standoff distance (3 inches). Column 9, lines 45-55 and column 11, lines 10-60, note, for example, in run no. 2, for example, with no shroud gas flow, the first or 0 flow rate, oxygen conc. is 14.0, going down to 2.1 as the flow rate of the shroud gas is increased (Table 2).

Claim 3: As shown by Example 3, oxygen concentration in the spray jets of shrouded spray devices of Zurecki can be well over 50% less than for unshrouded jets at the same standoff distance (3 inches). Column 9, lines 45-55 and column 11, lines 10-60, note, for example, in run no. 2, for example, with no shroud gas flow, the first or 0 flow rate, oxygen conc. is 14.0, going down to 2.1 as the flow rate of the shroud gas is increased (Table 2).

Claim 4, 5: the gas flow can be essentially turbulent. Column 3, lines 5-30 (the spray effluent from the spray device is turbulent, and the shroud gas is entrained in that flow).

Claim 9: the shield (shroud) gas can be nitrogen. See column 11, lines 10-60.

Zurecki teaches all the features of these claims except (1) that the resulting effect on microstructure will allow an extended standoff distance for the same microstructure, (2) that the material to be sprayed is a ceramic oxide (claim 2, 6, 11) and (3) that the shield gas is argon (claim 10).

However, Nowotarski teaches that when thermal spraying a turbulent fluid stream is ejected from a spray nozzle. Column 3, lines 20-60. The stream can carry coating material which can be metals, alloys, oxides, ceramics, and other materials. Column 3, lines 20-65. Nowotarski teaches the desire to surround the stream with a shielding gas flow of an inert gas such as nitrogen, argon, etc. See column 3, line 60 through column 4, line 40. The use of this shielding gas prevents oxygen from entering the spray stream so that oxidation or contamination of materials is minimized. Column 4, lines 20-35. The amount of shielding fluid ^{used}~~used~~ is such that the oxygen level at the point of impact can be less than 1%. Column 4, lines 25-35. Nowotarski teaches that by reducing the oxygen level, the standoff distance can be increased. Column 7, lines 35-55.

It would have been obvious to one of ordinary skill in the art at the time the invention is made to modify Zurecki to increase the standoff distance for the same microstructure as suggested by Nowotarski in order to provide a desirable coating, because Zurecki teaches that the use of the coaxial shielding gas provides a decreased oxygen level in the spray stream for a given distance, thus reducing oxidation of the applied coating (that is, providing a desired microstructure of limited further oxidation), and Nowotarski teaches that the use of shielding gas that provides a decreased oxygen level in the spray stream for a given distance can allow an increased standoff distance. This provides a longer standoff distance to get the same microstructure as without shielding, because the resulting microstructure provided by the presence of a first amount of oxygen will not occur until a longer standoff distance when shielding is used since that first amount of oxygen will be present in the stream a much greater distance (more

Art Unit: 1762

than 50 % as shown by Zurecki) from the nozzle. It would further have been obvious to modify Zurecki to perform the spraying with ceramic oxides as taught by Nowotarski with an expectation of desirable coating results, because Nowotarski teaches the desire to shield coatings of ceramics and oxides as well as metals, as the shield also prevents contamination. It would further have been obvious to modify Zurecki to perform the shielding with argon as taught by Nowotarski with an expectation of desirable coating results, because Zurecki teaches the desire to shield with an inert gas, such as nitrogen, and Nowotarski teaches the desire to shield ^{sprays} coatings with inert gases, which can include argon as well as nitrogen.

8. Claims 7-8 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zurecki in view of Nowotarski as applied to claims 1-6 and 9-11 above, and further in view of the admitted state of the prior art.

Zurecki in view of Nowotarski teaches all the features of these claims except (1) that the ceramic oxide is zirconia (claims 7, 12) and (2) that multiple layers of coating material are provided (claims 8, 13).

However, the admitted state of the prior art, at pages 4-5, teaches that it is well known to apply ceramic coatings by thermal spraying. These ceramic coatings can include thermal barrier coatings. The thermal barrier coatings are often multilayer coatings with a metallic bond coat followed by a ceramic top coat. The ceramic top coat is usually based on zirconium oxide (zirconia). The metallic bond coat can also be applied by thermal spraying.

It would have been obvious to one of ordinary skill in the art the time the invention was made to modify Zurecki in view of Nowotarski to apply a zirconia coating and to apply a multilayer coating such as a thermal barrier coating of metallic bond coat followed by ceramic top coat as suggested by the admitted state of the prior art with an expectation of providing a desirable coating, because Zurecki in view of Nowotarski teaches a gas shielding system for thermal spraying that can be used with metals or ceramic oxides and the admitted state of the prior art teaches that when thermal spraying a desirable coating system to apply is metal bond coats followed by zirconia top coats.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:30-4:00) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (571) 272-1415. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


KATHERINE BAREFORD
PRIMARY EXAMINER